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Dissociation Kinetics of Gaseous Ozone in Onion (*Allium Cepa* L.) Bulbs

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ABSTRACT

Ozone decomposition kinetics varies significantly in the presence of biological commodity. This variation depends on many factors but primarily on the active sites in agricultural commodities and storage environments. Ozone decomposition kinetics in onion bulbs at temperatures (2, 10, and 18°C) and relative humidity (RH) (35 & 85%) for different ozone concentrations (100, 200, 300 ppm) and number of exposures (1, 2, 3) were investigated. Zero-order, first-order, and second-order kinetic models were fitted to the ozone decomposition data with respect to time. It was found that the decomposition kinetics follows a first-order reaction and the decomposition rate constant (k_d) varies from 1.712×10^{-3} s^{-1} – 5.181×10^{-3} s^{-1} in the presence of onion. The half-life period ($t_{1/2}$) was found to increase with concentration and number of exposures and decrease with temperature and relative humidity. The activation energy was found to vary between 1.840 and 10.216 kJ $mole^{-1}$ and 6.271–12.461 kJ $mole^{-1}$ for the relative humidity of 85% and 35%, respectively.

KEYWORDS: *Activation energy* *Decomposition* *Gaseous ozone* *Onion* *Temperature*

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Supplementary material

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